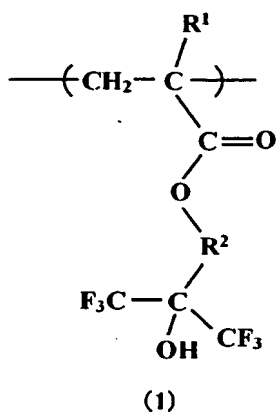


CLAIMS

1. An immersion upper layer film composition applied to coat on a photoresist film when using an immersion exposure device which is irradiated through water provided between a lens and the photoresist film, and the composition comprising a resin forming a water-stable film during irradiation and being dissolved in a subsequent developer, and a solvent containing a monovalent alcohol having 6 or less carbon atoms.
2. The immersion upper layer film composition according to claim 1, wherein the resin comprises a recurring unit having a fluorine atom-containing group on the side chain.
3. The immersion upper layer film composition according to claim 2, wherein the recurring unit having a fluorine atom-containing group on the side chain is at least one recurring unit selected from a recurring unit having an alcoholic hydroxyl group on the side chain containing a fluoroalkyl group on at least the carbon atom of α -position and a recurring unit having a fluoroalkyl group on the side chain.
4. The immersion upper layer film composition according to claim 3, wherein the recurring unit having a fluorine atom-containing group on the side chain is the recurring unit having an alcoholic hydroxyl group on the side chain containing the fluoroalkyl group on at least the carbon atom of α -position.
5. The immersion upper layer film composition according to claim 3, wherein the recurring unit having an alcoholic hydroxyl group on the side chain containing the fluoroalkyl group on at least the carbon atom of α -position comprises a recurring unit of the following formula (1),



wherein R¹ represents a hydrogen atom or a methyl group, and R² represents an organic group.

6. The immersion upper layer film composition according to claim 5, wherein the organic group is a divalent hydrocarbon group.

7. The immersion upper layer film composition according to claim 6, wherein the divalent hydrocarbon group is a group inserted an alkylene group having 1 to 4 carbon atoms between an alicyclic hydrocarbon group and a bistrifluoromethyl-hydroxy-methyl group.

8. The immersion upper layer film composition according to claim 6, wherein the divalent hydrocarbon group is a hydrocarbon group having a 2,5-norbornylene group, or a 1,2-propylene group.

9. The immersion upper layer film composition according to claim 1, wherein the resin is an alkali-soluble resin dissolving an alkaline aqueous solution during development using the alkaline aqueous solution.

10. The immersion upper layer film composition according to claim 9, wherein the alkali-soluble resin is a resin containing at least one recurring unit selected from a recurring unit having a carboxyl group, a recurring unit having a phenol site and a recurring unit having a fluorine atom-containing group on the side chain.

11. The immersion upper layer film composition according to claim 10, wherein the recurring unit having a fluorine atom-containing group on the side chain is at least one recurring unit selected from a recurring unit having an alcoholic hydroxyl group on the side chain containing a fluoroalkyl group on at least the carbon atom of α -position, and a recurring unit having a fluoroalkyl group on the side chain.

12. The immersion upper layer film composition according to claim 1, wherein the solvent containing a monovalent alcohol having 6 or less carbon atoms is a solvent containing at least 65 wt% or more of the monovalent alcohol having 6 or less carbon atoms.

13. The immersion upper layer film composition according to claim 12, wherein the monovalent alcohol having 6 or less carbon atoms is at least one monovalent alcohol selected from 2-propanol, 1-butanol, 2-butanol, 2-methyl-2-propanol, 3-methyl-2-pentanol and 4-methyl-2-pentanol.

14. A method to form a photoresist pattern comprising the steps of, forming a photoresist film by applying the photoresist on a substrate, forming an upper layer film on the photoresist film, and forming a resist pattern by exposure with radiation through a predetermined mask pattern with water and development,

wherein the process of forming the upper layer film is the process by using the immersion upper layer film composition according to claim 1.